The MAC Flyer

NOVEMBER 1982

Rewinging the Herk . . . page 4

The MAC Flyer

MILITARY AIRLIFT COMMAND

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BRIG GEN PHILIP S. PRINCE Inspector General
COL LOUIE O. McFERON Director of Safety

MAJ JAMES M. LEE Supervising Editor
CAPT GALE E. CLOUSE, JR. Associate Editor
CAPT BYRON L. HOWARD Associate Editor
FRANCES A. CALDWELL Managing Editor
TOM O'LAUGHLIN Art Director

For Greater Safety and Efficiency in MAC Air Operations.

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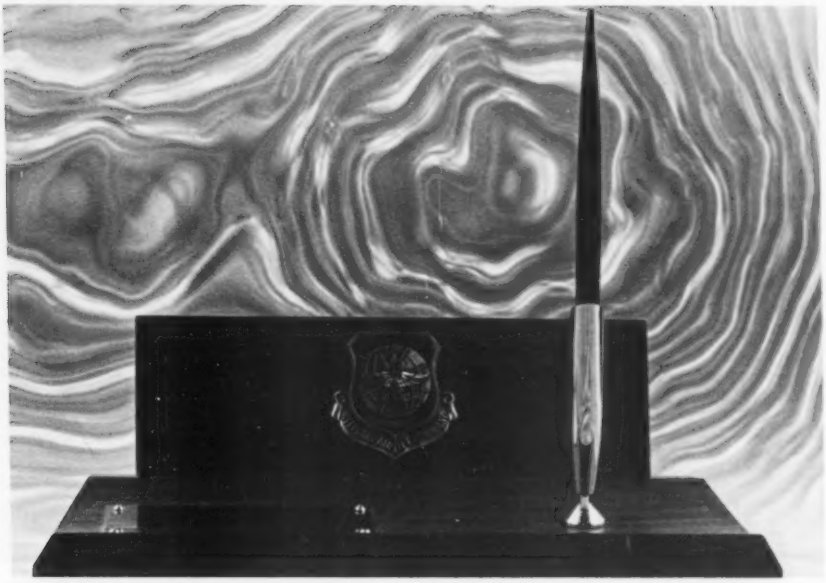


The Perfect Prize

Love, fame, fortune and fun await you when you enter the 1983 MAC Flying Safety Writing Contest. Well, perhaps not love and fortune, but certainly fame if you win, and fun even if you don't. Consider the kudos from your commanders and the warm fuzzies from your friends for the fame portion. The fun comes from letting your mind create a literary tale or poem about your own or someone else's flying exploits.

Our contest officially opens this month and we're eagerly anticipating your forthcoming prize-winning entry. In fact, everyone who enters our contest is a winner. By merely entering and following the rules below, you win one correctly-fitting, C.R. Terror T-shirt. We also include a personal 1-year subscription to *The MAC Flyer* sent directly to you. Both T-shirt and subscription are yours for putting typewriter to page and, of course, sending us the final product.

We also have some "pretty nifty" award-winning prizes. First, second and third place winners will receive a handsome desk set to attest to their literary prowess. In addition, there are nine—count'em—"9" honorable mention winners who receive engraved wall plaques.

So, come one, come all and celebrate the opening of the 1983 MAC Flying Safety Writing Contest. Start today and create a perfect prize-winning story of your your own.

The Rules

The 1983 MAC Flying Safety Writing Contest is conducted according to MACR 900-3 and the following rules. All entries must be original, unpublished and postmarked no later than 31 March 1983. Stories must be between 1,000 and 3,000 words long (about 6 to 14 double-spaced typed pages); poetry should be about 75 to 100 lines. Entries must contain an ***aviation safety message.*** Manuscripts must be double-space typed and submitted in ***two copies.*** Identify entries by title only, and attach a cover sheet showing the author's name, address, duty phone number and unit. Also, the cover sheet should contain a brief autobiography.

The contest is open to anyone. Entries qualifying under the above rules earn their author a free C.R. Terror T-shirt *(so indicate your size)* and a free 1-year subscription to *The MAC Flyer.* However, contest prizes (desk sets and plaques) may only be awarded to military and civilian employees of the Department of the Air Force or Air Reserve Forces. Other entrants may be selected for Honorable Mention in a Special Category. All winning stories will be published in *The MAC Flyer.* Entries should be addressed to:

Safety Writing Contest
HQ MAC/IGFE
SCOTT AFB IL 62225

New Wings for Old Birds

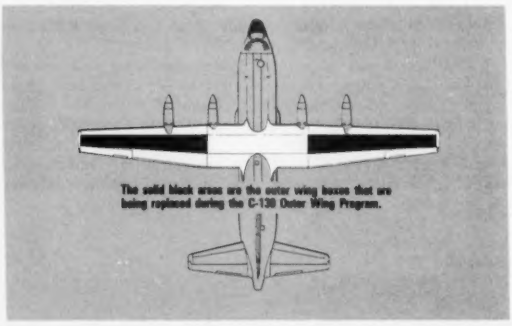
Rewinging the Herk

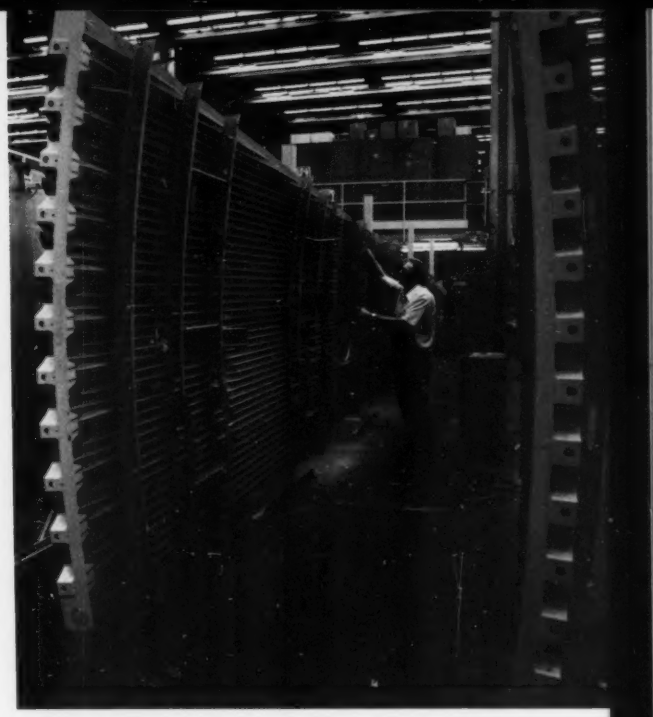
by Captain Gale E. Clouse, Jr.
Associate Editor

What's new and improved and coming to your very own C-130 in early 1984? (No, it's not your own inertial nav system, although that's due for installation beginning in 1986.) What is new for the venerable old birds are the outer wings. We'll soon see new outer wings on 495 C-130s as part of an Air Force-wide Hercules fleet enhancement program. The C-130 models included in the Air Force outer wing program include C-130B/Es, WC-130E/Hs, and HC-130H/P/Ns. The WC-130s and HC-130s are modified E-models. Deliveries of rewinged Herks back to MAC and other users are slated to begin in early 1984. The various series of Herks listed above will get the new and improved C-130H box beams.

Some Air Force C-130s will not undergo the outer wing program. The 137 C-130A and D-models will continue to have their outer wings selectively refurbished under normal depot maintenance. Since their present outer wings are anticipated to have a 40,000 hour service life, C-130Hs (1973 and all subsequent C-130s) will not participate in the outer wing modification program.

Lockheed-Georgia Company at Marietta, Georgia, will begin manufacturing the new outer wings for the bulk of the Air Force C-130 fleet in 1983. After production, they'll then ship them to selected depot maintenance facilities for final installation.





View of the completed right hand upper panel of the C-130 outer wing.

Herks have been undergoing structural integrity improvements for several years. Between 1968 and 1972, 460 C-130B/E and HC-130H/P aircraft completed a center wing replacement modification program. Great Britain completed an outer wing rehabilitation program in the 1970s. The U.S. Navy began an outer wing program for its EC-130Qs, C-130Fs and KC-130Fs in late 1978. The Navy program, now known as the Service Life Extension Program, involves considerable rework at the factory including replacement of the outer wings on some aircraft.

Besides these specific programs, various C-130 full-scale wing tests have been conducted. These tests have identified fatigue-sensitive areas in the outer wing structure. The third full-scale fatigue test led to an improved redesign to the C-130 outer wing. This new outer wing became the production baseline configuration on USAF C-130H (1973-1974) aircraft. Since that time, all C-130s coming off the assembly line have had the new outer wing design.

We told you you'd be getting a "new and improved" C-130 outer wing. Starting in October 1983, the baseline configuration for the C-130 outer wing will feature the "FY 84 model." This new '84 outer wing, 562 inches long, will incorporate many of the design features of the '73 outer wing as well as some significant improvements.

The '84 outer wing will also use 7075-T73

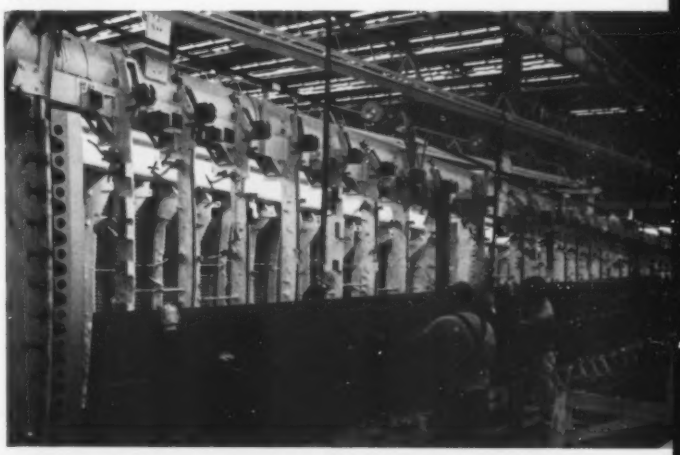
aluminum alloy to better protect against corrosion. In addition, local areas of the outer wing upper and lower surface panels, the front and rear beams, and selected ribs will be "beefed-up." Hi-Tigue-interference-fit fasteners and seal nuts will be used as the basic fastener system on the new outer wings. Taper loks and standard washer nuts, however, will be retained in some locations. The new fastener system will improve leak protection for the '84 outer wings. Look for an improved dry bay finish system featuring a lighter color, too. The finish system will better resist corrosion and will be easier to inspect. Also coming are flap track stiffener and rib-cap/brace changes in the outer wing. And if you have suffered a lightning strike recently, take heart. The new C-130 outer wing skin panel thickness will be increased, where necessary, to a minimum of .080 inch, affording improved protection against lightning strike penetration. With these improvements, the service life of the new outer wings will be like those installed on new production C-130s which are expected to have a 40,000 hour service life.

Another key engineering change in the '84 outer wings will be a new fuel quantity probe system (similar to the C-141 system). Our maintenance folks will now be able to test, remove, and replace fuel quantity probes in each outer wing without entering the fuel tanks. Today, repairing fuel quantity systems problems in C-130 outer wings involves numerous manhours in repair time. Maintenance troops have to drain and purge the wing and then go into the fuel tanks to repair or replace fuel quantity probes or wiring in all present C-130 aircraft (including the H-model). With installation of blue foam into current wings, the present process is made even more time consuming. The new fuel-probe system will decrease the maintenance downtime of all Herks and increase availability and utilization. Besides reducing repair time, the cost of spares on the new fuel indicating system will be less. The modification reduces the number of probes from 20 to 11 per outer wing. The spare probes requirement for the 495 aircraft will, consequently, be approximately 50 percent less.

Timing

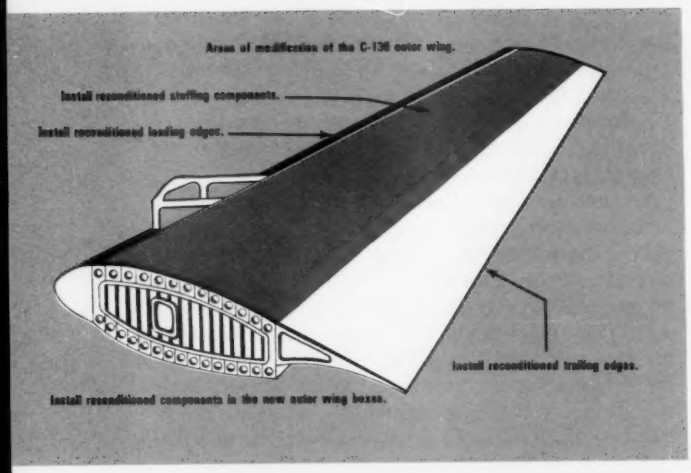
The two major portions of the Air Force C-130 outer wing program are production and installation. Lockheed-Georgia will manufacture the FY 84 C-130H wing boxes without trailing edges, leading edges, plumbing, wiring, engine nacelles, and pylon tanks. They will ship these wing boxes and all the new fuel probes to various C-130 programmed depot maintenance (PDM) facilities beginning in October 1983. These PDM facilities include the Warner Robins Air Logistics Center, Robins AFB, Georgia; Hayes International Corporation, Birmingham, Alabama; Aero Corporation, Lake City, Florida; San Antonio Air Logistics Center at Kelly AFB, Texas; and Lockheed Air Service (LAS), Ontario, California.

Installation at these facilities will take place during the normal 90-120 day PDM cycle for each aircraft. At the PDM facility the existing leading edges, trailing edges, plumbing, blue foam, and wiring will be removed from the old outer wings and will be reconditioned as necessary. These materials along with the new fuel probes will be installed into the new box beam. As we've already mentioned, the first C-130 with new outer wings should be delivered in early (around February) 1984.



View of lower right hand skin panels for lower surface of outer wings. A total of four panels are loaded into position in the manufacturing process.

View of C-130 outer wings in main assembly area.


Areas of modification of the C-130 outer wing.
Install reconditioned stiffing components.
Install reconditioned leading edges.
Install reconditioned trailing edges.
Install reconditioned components in the new outer wing boxes.

Photos courtesy of Lockheed-Georgia

View of present C-130H outer wing.

The production and delivery schedule for the Air Force C-130 outer wing program has been accelerated recently. In April 1981, the Air Force signed a letter contract with Lockheed-Georgia for the outer wing program and signed a final contract in December 1981. In June 1982, a revised and accelerated C-130 outer wing program was agreed upon. The new schedule calls for installations to start at a rate of three per month in November 1983. This increases to a rate of seven per month between March through August 1984, and reaches a final rate of nine per month in September 1984. The Air Force C-130 outer wing program will be complete in December 1988.

Fatigue-Cracking/Corrosion

Primary problems with the C-130B/E outer wings have been corrosion and fatigue cracking as the wings approach the end of their service life. The new outer wing box will provide improved structural integrity, and a safer aircraft. A secondary problem with the C-130B/E outer wing structure has been high fuel leak rates. The fuel leak rate on the new outer wing should decrease the maintenance manhours per flight hour significantly, compared with earlier C-130E leak rates. This is based on the experience of C-130H outer wings manufactured since 1973 and the improvements that are being made in the '84 wing.

Coming Soon

The "new and improved" outer wings for the Air Force C-130B/E, WC-130E/H, and HC-130H/P/N fleet are on the way. The improvements in the new outer wing mean a lengthened service life for the ageless Herks as well as greater safety for all involved. With this structural improvement, we can be confident that our rewinged and trusty Herks will be flying well into the 21st century.

Editor's Note—Recent operating restrictions placed on the C-130 fleet, at present, have not further accelerated the Air Force C-130 outer wing program as discussed in this article.

Development of the U.S. Army Corps Shoulder Harness

by Maj Gen Harry G. Armstrong, USAF (Ret)

Occasionally, the results of medical research and development do not appear to be worthy of publication until years later. An excellent example of this follows—Ed.

In the fall of 1937, Major Malcom Grow, the Air Surgeon, landed at Bolling Field, D.C. where there had just been a crash of a two-seated aircraft. He inspected the wreck and noticed blood on and below the instrument panels of both cockpits. Later, at the hospital, he found that the two airmen had died from skull fractures which resulted when their heads struck the respective instrument panels with great force. There were no other injuries.

At that time, I was the director of what was then called the Physiological Research Laboratory at Wright Field, Ohio. Major Grow, after telling me of his observations, asked that I attempt to develop some form of a body restraint as a means of preventing the type of injury he had described. In response, I fabricated a shoulder-type safety belt and sent it to those in the Air Corps who were concerned with such matters, along with a recommendation that it be adopted. My recommendation was rejected based on the premise that, with the body restrained during an accident, the unsupported head would snap forward and break the person's neck.

While this appeared to be a logical assumption, we decided to investigate its validity. To accomplish this, a seat was removed from an aircraft and fitted with both lap- and shoulder-type belts.

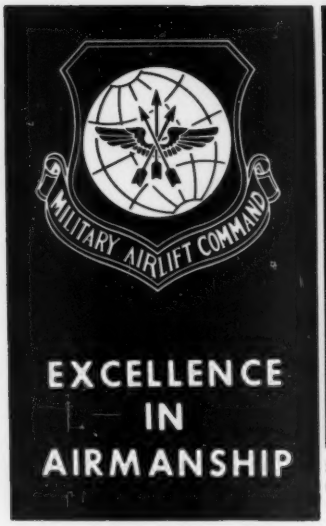
To simulate a crash, the seat and its occupant (me) were propelled forward to a predetermined speed and then brought to an essentially instantaneous halt. In the first series of tests, only the lap belt was used and it was found that during an abrupt deceleration of 8 Gs or more, my head would have forcefully impacted with the instrument panel—if one had been in place.

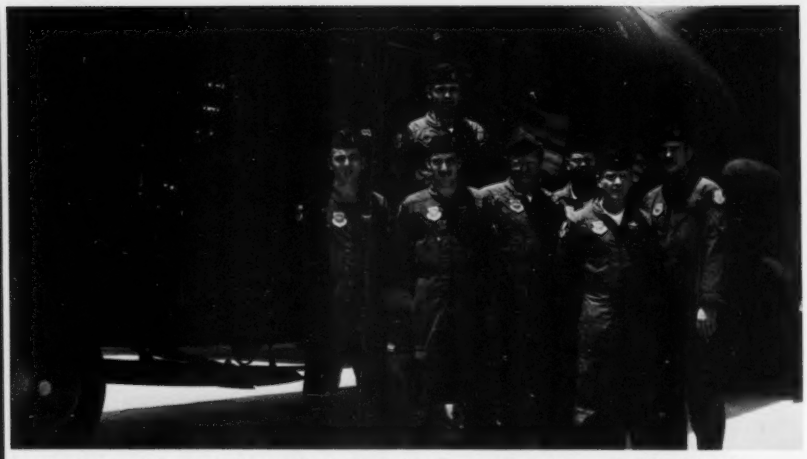
During the next series of tests both lap *and* shoulder belts were used and the decelerations gradually increased up to an estimated 30 Gs. The latter could only be estimated since the only instrument available to measure deceleration forces then was limited to 12 Gs.

Neither during, nor after any of these tests did I suffer any injury or even discomfort to my neck. This was reported to the Air Corps authorities and again I recommended that the shoulder-type belt be adopted. This time it was approved and subsequently became a standard cockpit item in both military and civilian aircraft.

Subsequently, the shoulder-type belt was installed in most surface motor vehicles throughout the world. Since then, it has saved untold lives and prevented serious injuries to tens if not hundreds of thousands of those involved in vehicular accidents of all types. As a consequence of this, it is apparent that few individuals in history contributed more to accident prevention than the late Maj. Gen. Malcom C. Grow.

—Aviation Space and Environmental Medicine





Standing left to right: 1st Lt Peyton Cook, CP; 2nd Lt Thomas E. Robinson, N; MSgt Willie G. Poole, FE; SSgt Ronald Smith, LM; TSgt Albert G. Conlon, FECS; and TSgt John J. Connell, Jr., FERS. Standing on crew door: Capt Larry Thompson, IAC.

Captain Larry J. Thompson and crew, 33 ARRS, were flying an HC-130P on a Team Spirit '82 exercise. After departing Chong-Ju Air Base, Korea, and passing 14,000 feet on the climbout, the loadmaster, Staff Sergeant Ronald Smith, spotted oil coming from the number 2 engine drip mast. Master Sergeant Willie Poole, the flight engineer, inspected the leak and verified a corresponding decrease on the oil quantity gauge. Captain Thompson immediately directed shutdown of the number 2 engine, declared an emergency and prepared to return to Chong-Ju.

Before the crew could land, however, two additional malfunctions further complicated the inflight emergency. As the gear was lowered, the light in the handle did not illuminate and would not press to test. As if this wasn't enough, the crew noticed the prop low-oil light on the number 1 engine begin to flicker. Captain Thompson then directed the engineer to start dumping fuel to bring the aircraft within two-engine weight limits. Since the number 1 prop was governing properly and the prop low oil light was intermittent, the crew elected to leave the number 1 engine running and try to get a safe gear indicator.

Captain Thompson requested a visual check of the gear. This was more difficult than usual, since the right benson tank was installed and obscured the right gear inspection window. Both the left and nose gear inspection windows were also totally useless due to accumulated dirt. Continuing their excellent crew coordination, Master Sergeant Poole squeezed behind the tank and confirmed the right gear was safe. Staff Sergeant Smith removed the inspection windows for the left and nose gears and confirmed the left main gear was also safe. However, the nose gear indicating pin was not extended enough to see the fluorescent ring, indicating the nose gear was not fully down and locked. A low approach past the tower confirmed the in-transit condition of the nose gear, and the crew elected to attempt to recycle the gear. The gear-handle light still did not work properly when the gear was raised and would not properly test even after the bulbs were changed. The gear was then lowered, again resulting in improper gear indications. Although the pin in the nose gear extended farther on the second attempt, the fluorescent ring was still not visible. Since individual gear indications showed the gear down and locked, however, Captain Thompson and his crew made the decision to land.

The landing was made with the number 2 engine shut down, the number 1 engine prop low oil light flickering and uncertain confidence in the nose gear. During the ground roll, the number 1 engine prop low oil light came on steady. The crew then shut down the number 1 engine and completed the landing roll using maximum braking. After stopping, Captain Thompson, fearing problems with hot brakes, directed a ground evacuation. The professionalism and outstanding systems knowledge demonstrated by Captain Thompson and crew when faced with

multiple airborne emergencies allowed them to safely recover a valuable aircraft.

1st Lt James D. Smith

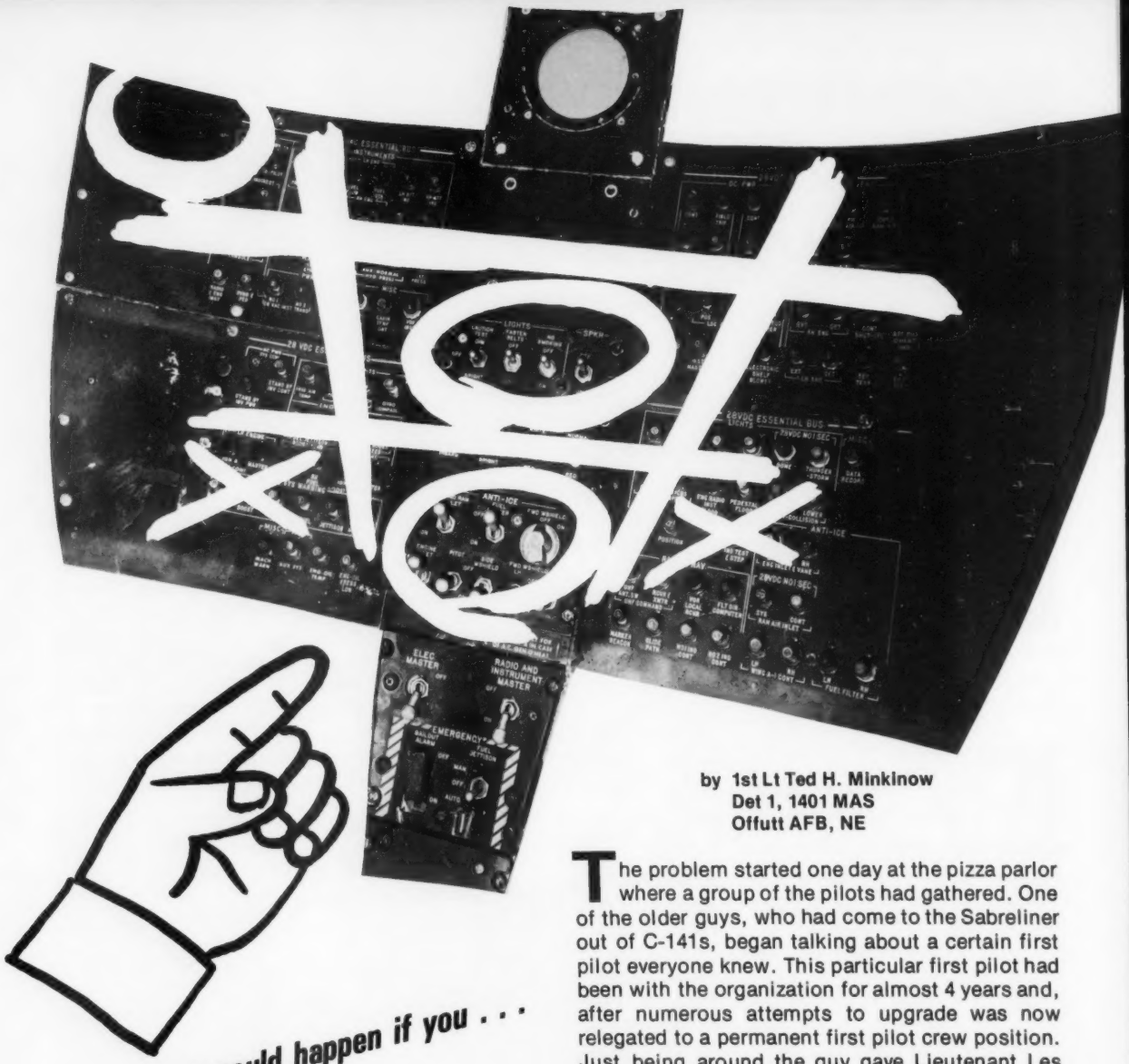
First Lieutenant James D. Smith, Detachment 2, 37 ARRS. On 24 May 1982, First Lieutenant Smith was flying a solo local area mission in a single engine TH-1F helicopter. While approximately 700 feet above the ground, he experienced an abrupt left yaw of the aircraft. A low RPM audio warning horn and warning light quickly followed. Determining that the engine had failed, Lieutenant Smith immediately lowered the collective, entered a power-off autorotation and turned the helicopter 120° into the wind. After broadcasting a Mayday call, he aligned the aircraft for a landing in an open field. At about 100 feet above the ground he increased collective to further slow his descent and to cushion his landing. Lieutenant Smith finally made a zero forward airspeed landing in a muddy field. Although the helicopter settled into the mud, it was undamaged. Lieutenant Smith demonstrated an outstanding assessment of the situation and finesse in landing the crippled helicopter. His actions prevented injury to himself, damage to his aircraft and demonstrated him worthy of the Excellence in Airmanship Award.

Major Cross and Lieutenant Colonel Smith, 1402 MAS. The CT-39 was on the second leg of a mission enroute from MacDill AFB, Florida, to Scott AFB, Illinois. The flight progressed normally until the descent into Scott started. In order to comply with an air traffic control request for an expedited descent, the crew deployed the speed brake while passing through FL 180. Although the speed brake operated normally, both pilots heard a loud snap.

The Sabreliner then entered instrument flight conditions and the crew realized they had lost both VHF and UHF radios. They checked the cockpit for popped circuit breakers, found none, and continued their IMC descent while selecting 7600 on the IFF. While attempting to intercept the ILS final approach course, they discovered the localizer, tacan and DME were also not working properly.

At 10 miles from Scott, the crew cautiously continued a descent to their previously assigned altitude of 2,000 feet. Still in instrument flight conditions, they descended another 150 feet. Spotting a small opening in the clouds, they then made a rapid descent through the hole and entered visual flight conditions at approximately 750 to 900 feet above ground level. After establishing their position by identifying local landmarks, the pilots were able to make their way to the runway, landing with only 1,500 pounds of fuel remaining. The quick thinking and professional airmanship of Major Cross and Lieutenant Colonel Smith prevented the possible loss of a valuable Air Force aircraft, its crew, and the six passengers on board.

Maj Rod Cross and Lt Col Robert Smith



This is what could happen if you . . .

Switch Write-Ups

by 1st Lt Ted H. Minkinow
Det 1, 1401 MAS
Offutt AFB, NE

The problem started one day at the pizza parlor where a group of the pilots had gathered. One of the older guys, who had come to the Sabreliner out of C-141s, began talking about a certain first pilot everyone knew. This particular first pilot had been with the organization for almost 4 years and, after numerous attempts to upgrade was now relegated to a permanent first pilot crew position. Just being around the guy gave Lieutenant Les Wright, a CT-39 AC, the shivers. Whenever Les had erred as a new copilot, it was jokingly threatened that he, too, could become a permanent right-seater. Consequently, the failures of the unlucky pilot served as a good example for Wright of "what not to do."

"As we were exiting the weather one night," explained the old pilot to the crew, "our famous first pilot reached up to turn off the engine anti-ice, but grabbed the electrical master switch instead. Everything suddenly went dark in the

Honorable Mention, 1982 MAC Flying Safety Writing Contest

cockpit, and I immediately realized what he had done. After restoring electrical power to the airplane, I sent the guy to the back to get me some coffee. That's about the only thing he can do without supervision," concluded the former Starlifter driver laughingly.

The story got a chuckle out of the group. As the final glasses of beer were being squeezed out of the pitchers, Les visualized the overhead panel which houses the switches. The electrical master and the anti-ice toggles are extremely close, he thought. At pilot training, he recalled, all the critical switches were red guarded. If they don't do it that way in the "real" Air Force, then I guess it's just up to us pilots to check the position of our hands before we move a switch. The young AC silently promised that he would never find himself in such an embarrassing situation. With that, Les left the group to get some crew rest since he had an early mission the next day.

Les' mission moved along fine and before they knew it, the crew was on their final leg home. This leg, he figured, would put him over the hour requirement for upgrade to IP. After reaching cruise altitude, the copilot left his seat to get some refreshments, but forgot to turn off the anti-ice. Wright, noticing the omission, reached for the switch as ATC called out traffic. While acknowledging the transmission from center, the AC flipped the "anti-ice switch" to off, and everything in the cockpit went dark.

Les managed to quickly turn the electrical master switch back on before the copilot's return. Unfortunately, the surge of instantaneous electrical power caused a short somewhere in the system and power could not be restored. With oxygen masks on and an emergency descent in progress, the crew accomplished the "electrical system malfunction" checklist but without success. Lieutenant Wright remained outwardly calm throughout the ordeal; it was VFR outside and the crew had spoted a suitable landing field. After a perfect landing, the new AC concentrated on how best to explain his blunder. He had two choices. He could tell maintenance what really happened and have them fix the faulty wire, or he could just claim that the power had failed on its own. The first choice would surely end his hopes of being an IP. His name would then become the focus for the "lunchtime tales," and the old heads would equate his abilities to those of the "permanent first pilot." The second choice would require a lie, but not, as Les rationalized, a big lie. After all, he reasoned, the surge of cycling the electrical master power switch should not have caused an electrical failure. Besides, he continued, there were no passengers in jeopardy and I have returned the aircraft safely. Maintenance should be able to find the problem without my help, especially if they are as good as they say they are. They'll certainly have to be flown here one way or the other, regardless of what I say. After further reflection, the lieutenant concluded it would be best "career-wise," to opt for choice two. After one day here to fix the bird, I'll fly it home. The guys will think I did a great job, and that will be the end of the story, he concluded *erroneously*.

Along with the maintenance team, which Les had expected, came a mishap investigation team. The maintenance technicians unsuccessfully attempted to track down the problem. They replaced most of the wiring and electrical connections without troubleshooting the area around the electrical master switch.

About a week later, Captain Steve Bell started the engines of this very same Sabreliner for a short mission to Cheyenne. The flight was going to be a "milk run" for Bell. The ceilings at both Cheyenne and his home base were at 5,000 feet, easy VFR weather as far as the IP was concerned. Although a stationary front was camped between the two airfields, there were no reports of thunderstorms within a hundred miles. Transient alert was not available at Cheyenne, but luckily, the weather conditions would allow the crew to make the entire trip without refueling. I'll be home tonight in time to play in a softball game, thought Bell as he released the brakes for takeoff.

. . . the aircraft exited the clouds nose low in 110° of bank.

As briefed, the crew entered the clouds around 5,000 feet. The AC was not really surprised when he was still in instrument conditions during cruise at FL 290. Along the entire route he heard numerous airliners putting the tops at about 41,000 feet, far above any altitude he could attain. The descent into Cheyenne went smoothly, with the clouds ending at 4,000 feet. After landing, the crew entered the alert shack to await their lone passenger, a major general who had been out inspecting some missile sites. The general finally arrived about an hour after the scheduled takeoff

time. Steve thought he could still make it home in time for the second inning, and hoped the team could come up with a replacement until then.

Once again, the aircraft entered the weather and remained there for the entire leg home. As the copilot started the descent, the general brought some coffee to the pilots. Steve knew the man and always enjoyed his company. The general enjoyed standing between the seats for at least 30 minutes each flight to engage in friendly conversation. As the copilot was bragging about his blossoming tomato plants, he reached up to turn off the anti-ice. Instead, he grabbed that non-red guarded electrical master switch and once again, a crew found themselves in the dark. As before, resetting the switch did not restore electrical power.

Captain Bell's first instinct was to let the Sabreliner fly itself. He had it fairly well trimmed and, at first, the needle and ball remained centered. Knowing the top of the weather to be far above, and taking into account the light load of fuel, the IP decided to continue the descent. His copilot meanwhile, ran the emergency checklist, but to no avail. Just as Bell was becoming comfortable with no attitude indicator to fly by, the aircraft entered a pocket of turbulence which caused the needle and ball to bounce from end to end. Now there were no attitude references to fly by.

Suddenly the airspeed started to increase rapidly. Bell attempted to right the plummeting aircraft to his best guess at wings level. He had often wondered what the last thoughts were of a pilot who was about to buy the farm, but had hoped never to find out. As the needle raced past the limiting airspeed, the aircraft exited the clouds extremely nose low and in approximately 110° of bank. The IP used the 3,000 feet between his craft and the ground to roll wings level, drop the boards, and pull back on the yoke with all his strength. The impact that Bell expected never materialized. The Sabreliner regained controlled flight a bare 200 feet above the terrain. Shaken, the crew managed to navigate the last 40 miles using a highway as reference.

This time the maintenance team found the defective circuit. The investigation board dubbed the mishap "pilot error." The crew should have certainly followed correct procedures by checking the switch before moving it; that's a fact. And perhaps, until an improvement is made in the protection of critical switches with guards and careful positioning, the same mistakes will be made over and over again. The pilot most responsible for this mishap, however, was not even on the aircraft. He knew though, that he was to blame. There will always be, Lieutenant Wright justified to himself, reasons and justifications for not entering an exact write-up. In his case, the reasons were peer pressure and the selfish and unfounded belief that to "come clean" on a mistake would cause him never to upgrade to IP. He believed no pilots or passengers' lives were endangered since the weather was clear, and that maintenance could fix the intricate problem without exact information. After all, they knew where and what to look for. He realized then that his decision not only affected his own mission and crew, but also endangered anyone else who trusted his signature on the 781. The thought that Les Wright—boy AC, was very nearly responsible for the death of three men, and the loss of an aircraft (not to mention the wasted money and manpower at having caused needless investigations and repairs), caused the young AC to request his name be removed from consideration for upgrade until later. He knew he had a lot more to learn about flying, and hopefully, a whole career ahead in which to become educated about responsibility.

ABOUT THE AUTHOR

Lieutenant Minkinow is a 1979 graduate of the Air Force Academy where he majored in political science and history. After pilot training at Columbus AFB, Mississippi, he was assigned to Offutt AFB, Nebraska, at a CT-39 pilot. Lieutenant Minkinow is a previous contributor to *The MAC Flyer*, winning third place in the 1981 MAC Flying Safety Writing Contest.

Flight Lines

C-141 AC School

Captain Todd's article "You're Not Just a Pilot, You're an Aircraft Commander," *TMF* May 82), was timely and well written. Especially his point that knowing a little about crew duties allows you to ask the right people the "right" questions.

The statement that "no formal school or text book you read will give you all the answers," is, however, misleading. The Aircraft Commanders, school at the 443 MAW, Altus AFB, tries to do just that. I have flown with many of the instructors of that course. I know that even though this school can't give all the answers, they teach the new ACs the tools they will need to make sound decisions. As a former instructor in the 56 MAS and a safety officer, I know first hand the dedicated professionals that make up the MAC University at the 443 MAW. They truly deserve the motto "We Teach the Pros."

Even though I am in the rated supplement, I still receive and enjoy *The MAC Flyer.* Keep up the good work.

Earl C. Justus, Major, USAF
Chief, Airborne Systems Engineering
Kelly AFB, Texas

***Thanks for your comments. We appreciate it. No school can, in 5 or 6 weeks, teach all the "ins" and "outs," the pros and cons of the art of aircraft commandering. It just can't be done—not even by the pros at the 443d. It takes maturity, experience, determination, knowledge, and a host of intangibles in the proper and unknown quantities to mold a person—a pilot—and make that person a leader—an aircraft commander.**

FOD City

"Give it some more power, Charlie. Looks like the asphalt is a little soft here." Recently several heavies departed our base and at least one put their engine over the rocky infield. You would not believe the amount of rocks covering the ramp now. The area around the Spanish F-4s was covered with rocks of throwing size about a foot apart, for a distance of 500 feet. One F-4 had an engine cover blown off and there were rocks in the intake. Please use caution when taxiing. The host base commander was really impressed.

Anonymous Flyer

***Thanks for pointing out the dangers of FOD at foreign bases. The lesson here is to stay on the taxi lines, keep your engines from going over the infield as much as possible, and refrain from the use of MAX power. Our go-fast brothers have other problems to worry about without additional FOD being kicked up by a pair of screaming TF-33s or TF-39s. Even a Herk with a pair of oversized window fans can do an equivalent amount of damage if the throttles are pushed up in an abrupt fashion, much less hanging your wingtip over the edge of the runway/taxiway. After all, we wouldn't want a pair of F-100 engines stuck up in our nose, would we?**

Fan Mail

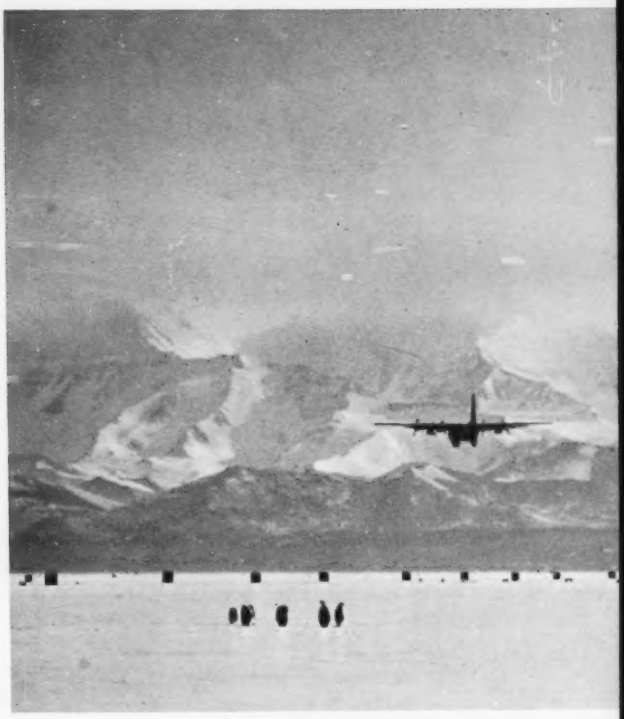
I don't usually write fan mail, but I believe you are long overdue a "well done" from a long-time reader. I am a retired, regular Air Force electronic maintenance officer, general aviation pilot, commercial and instrument instructor and Dean of Technology, Cleveland State College, Cleveland, Tennessee.

I use many of your safety and technical articles in my aviation classes. While your magazine is a military publication, its application to general aviation is excellent. Looking at your November 1981 issue, your general overview of different types of localizers is very good. Since I had some difficulty explaining the difference between front and back course localizer approaches, LDS, SDF, your simple explanation will be given to my students. I hope you parallel this article soon with PAR, DME, Radar, CAT II and CAT III, etc.

Again, I rate your magazine, FAA General Aviation, and AOPA the best for safety. You alone in the military stress safety in a simple and readable way.

Major Matt H. Reiser, USAF (Ret)
Dean of Technology

Photos courtesy of HQ MAC/Public Affairs.



Winter Weather Review

On January 13, 1982, an Air Florida Boeing 737 crashed immediately after takeoff from Washington National Airport, killing 74 of the 79 persons on board. The ill-fated airliner departed during moderate to heavy snowfall, failed to achieve a sufficient rate of climb, struck a bridge approximately 4,500 feet from the departure end of the runway and crashed into the Potomac River. As the investigation of this tragic accident continues, we in MAC can learn several critically important lessons.

As a result of its findings, the National Transportation Safety Board (NTSB) has indicated immediate corrective actions are required in the area of cold-weather operations to prevent any more winter weather-related mishaps. Specific areas addressed by the NTSB include: the effects of snow and ice-covered runways on takeoff performance; the aerodynamic effects of snow, ice and frost on aircraft surfaces; and the possible effects of engine-nacelle and pressure probe icing. Although our technical manuals contain extensive procedures for operating in such cold-weather conditions, a review of the problem areas identified by the NTSB might just save another busted up aircraft or, even worse, the needless loss of life.

All MAC aviators have been, or will be, faced with a takeoff on a snow, ice or slush-covered runway. Yet the question remains, have we really thought about the consequences of pressing on with a takeoff when the depth of that frozen precipitation exceeds the Dash One limitations? The advantage of 20/20 hindsight tells us that waiting for the runway to be plowed or to melt might make the difference between another uneventful departure and a disaster.

The effects of snow and ice on aircraft surfaces are well known to all aircrews—or at least they should be. But how many times has a crew considered departing despite a light coating of "harmless" frost glazing the aircraft? According to the experts, that "frosting" on the aircraft can be every bit as lethal as an accumulation of snow and ice and should be removed prior to flight.

As a direct result of the Air Florida investigation, the NTSB now requires commercial flight crews to visually recheck wing surfaces before takeoff. This "recheck" will be accomplished if snow or freezing precipitation is in progress and if 20 minutes or more have elapsed since deicing or since the surfaces were confirmed to be clear.

A final aspect of the cold-weather effect on the

Air Florida crash addressed by the NTSB was the effect of engine nacelle and pressure probe icing on the aircraft's takeoff performance. According to the NTSB, accumulated ice on the pressure probe may have given an abnormally high engine pressure ratio (EPR) reading in the cockpit of the accident aircraft. This may have caused the crew to assume they had takeoff EPR set when, in fact, the engines were operating at a thrust level lower than required for takeoff. But there are other cold-weather operating hazards not addressed by the NTSB in this investigation.

On January 23, 1982, a commercial DC-10 was attempting to stop following a landing on an icy runway at Boston, Massachusetts. The wide-bodied jet was unable to stop on the runway and slid off the end into Boston Harbor where the nose section broke off. The crew of 12 and 196 of the passengers escaped unharmed and waded ashore. It was later learned, however, that two passengers were missing and are presumed to have drowned.

In yet another January 1982 incident, a DC-9 skidded off a taxiway at Baltimore-Washington International Airport. The aircraft was reportedly taxiing "very slowly" when it encountered a patch of ice. There were no "known" patches of ice on the taxiways at the time of this incident. Fortunately, no damage or injuries resulted.

Finally, a twin-engine corporate aircraft departed Lexington, Kentucky, bound for Atlanta, Georgia, and was cleared to climb to 8,000 feet. After passing 5,300 feet, the pilot reported losing the left engine due to induction icing and requested an emergency return to Lexington. The pilot also reported difficulty in maintaining aircraft control. Witnesses to the ensuing crash reported the aircraft made a 360° turn at low altitude, rolled to the left and crashed inverted, killing all seven occupants onboard. Other aircraft operating in the area at the time of the accident reported heavy mixed airframe icing.

The list of aircraft destroyed and persons killed due to improper cold-weather operating procedures is, tragically, nearly endless. The accidents and incidents mentioned here are all true and are listed to make just one point. Winter flying is dangerous—*very dangerous*.

Editor's Note—The NTSB's investigation of the Air Florida tragedy is now complete and has been published. *TMF* will feature the in-depth results of the NTSB report in December's "Mishap With a Moral."

—Adapted from *Flight Safety Facts and Reports* and *Flight Safety Focus*.

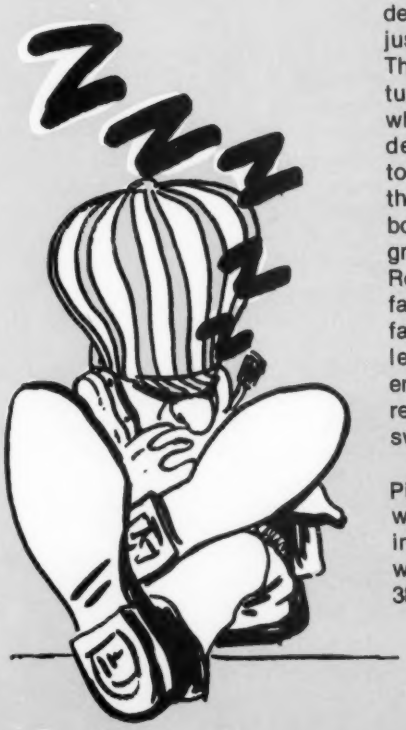
AWTH's Corner

Editor's Note— *As we start to bring you these anonymous aircrew reports as a regular feature, keep in mind that different AWTH reports will require different actions. In some cases, just making you aware of a deficiency or problem is the best response, as in a situation which requires hardware or facilities changes. More often than not, the reports you see in TMF early in the program tend to fall in that area. A number of valuable inputs have been received, but are not quite ready for publication, needing further investigation or documentation. Finally, though some reports may initiate positive action, they won't be published because of the danger of exposing the source of the report.*

The Tale of the Snoring Engineer.

This strat crew was bound for a "pleasant" crew rest at lovely Diego Garcia-by-the-sea. As usual, the crew was completely bushed by the time they hit the ground and headed for some welcomed "zzzzs." For those of you who have never had the "opportunity" to crewrest at Diego, the quarters there are based on the integral crew concept. Everyone on the crew sleeps in the same room. Crew rest will suffer, however, if there is a "snorer" in the crowd. And so, this tale continues, the flight engineer (could have easily been a nav, copilot, or loadmaster) snored and snored, and kept the rest of the crew from getting their full share of sleep. So, you may well ask, what do you do about it? If you declare crew rest, you'll just have to stay longer and listen to more of the same. There are, unfortunately, no definite solutions to this one.

Crewmembers who know they snore should alleviate the situation before it gets any worse by considering putting a pillow over their heads, or at least giving someone else the okay to nudge them or turn them over. For MAC-types who still have to transit Diego in spite of snoring roommates, take heart. Construction of the new crew quarters on the Indian Ocean atoll is now complete and should help you get the rest you need.



The Case of the Unguarded Switch

"I inadvertently turned off the electrical master switch . . ." That's the way this CT-39 AWTH report starts off and gets better, or worse, depending on how you look at it, as it goes on. Seems the Sabreliner crew was on descent passing FL 240 and had just broken into severe clear. The left-seater reached up to turn off the engine anti-ice, which had been on during the descent. At the instant he touched, or thought he touched, the correct switch, a sudden bolt of lightning of the cloud-to-ground type distracted him. Result: the crew was suddenly faced with complete electrical failure. Reason: the switch the left-seater thought was the engine anti-ice switch was in reality, the electrical master switch.

Cited by this Sabreliner Pilot, as contributing factors were task saturation, poor lighting, and a lack of experience with the aircraft. (He only had 380 hours in type.) You guys and

gals who fly the miniliners out there should be particularly aware of this potentially serious problem. Use extra caution when flipping switches, especially when the cumulative effects of time and weather could inadvertently take their toll—*you!*

As a result of the recognized CT-39 electrical problems, several changes have been proposed to the electrical system. Included in this package of improvements are suggested changes to the electrical master switch, and the addition of a battery thermal sensor and battery isolation switches. A separate modification package already approved will add a standby attitude indicator with a self-contained power pack. Until these modifications are installed, however, caution remains the watch word. For a further discussion of this subject, see "Switch Write-Ups" in this issue.

The Case of the Deceptive Flight Director

Ah, Frankfurt, the weather, as usual, is lovely—300 feet overcast and one half-mile in fog and rain. On the flight deck of the inbound C-141 B-model are not just two pilots. Verily, there are *four* pilots on yon flight deck. Yea, the plot thickens.

Prior to glide slope intercept, all instrument indications are normal. Some 15 seconds or so after starting down, though, the copilot's pitch and bank steering bars disappear from view and the glide slope course indicator freezes at the last position. (Name the correct quick fix and win a prize.) Instead of switching to "ADI Repeat" on the copilot's nav select panel, the four pilots try a myriad of other "quick fixes" all of which fail, and they very nearly cause a missed approach. The "lizard" lands uneventfully, no thanks to four aviator types whose ". . . S.A. was in the map case with the cover closed . . ." In other words, their *situational awareness* was a tad lacking.

The Case of the Lush(ous) Pilots

I'm just going to reprint this one verbatim from the AWTH Form, MAC Form 325, to wit:

"I feel alcohol will be a factor in our next aircraft accident. In the last 3 months, I've flown with two pilots that I've had questions about. In my estimation crews are violating the 12-hour limitation, in some cases quite openly."

We don't need to elaborate any more on this one. Alcohol and JP-4 just don't mix. Don't chance it. Abuse of the "bottle-to-throttle" is not only downright unprofessional, it is also dangerous—for the crew, the pax and you!

Awareness—the key to overcome . . .

The Stresses of Flight

by Captain Ann Helm, USAFR, NC
40th Aeromedical Evacuation Squadron
McChord, AFB, WA

While the average aircrew member is frequently briefed on the most sensational mishap causes and specific flying-safety hazards, the everyday and somewhat less sensational safety hazards may be overlooked in the process. The common stresses of flight, for instance, are thought by many to be "common knowledge" to all crewmembers, yet their significance is sometimes discounted since the prevailing attitude seems to be, "everybody knows that." But increased awareness of the stresses of flight can be one of the primary weapons in the constant battle to prevent disastrous mishaps and enhance both individual and group flying safety.

Environmental Stresses

There are three main groups of environmental flight stresses. These are: Thermal, noise levels and humidity factors. These three factors which crewmembers manage to tolerate can have individual and collective drains upon human energy.

• Thermal—Aircraft temperatures can sometimes fluctuate greatly throughout a given mission. Moreover, crewmembers are exposed to considerable variation in temperatures flying from climate to climate. Take for instance the Bravo-alert crew that unexpectedly found themselves going from Clark to Elmendorf one December. Ground heating or cooling systems, when available, can assist in reducing the extreme changes of temperature, stabilizing the aircraft environment. Crewmembers can preserve body energy sapped through temperature adjustments by dressing appropriately for both enroute and destination temperatures. (Alert crews take note).

• Humidity—Aircraft such as the C-141 provide less than 5 percent relative humidity after 2 hours of flight and less than 1 percent after 4 hours. A C-130 flight may range from 10 to 25 percent humidity. So what do these numbers mean? Well, humidity in the range of 5 to 10 percent results in chapped lips, itchy or dry skin with the possibility of sore throats, raspy voices and, of course, thirst. Crewmembers can prevent these symptoms by taking advantage of commercial products for eliminating the loss of skin moisture, such as lip balms, and by drinking plenty of water prior to the onset of thirst. Some individuals utilize spray mists to hydrate their environment.

• Noise Factors—Safety may be jeopardized by noise in the aircraft both in flight or on the ground (especially during engine-running-offloads). Repeated attempts to communicate in high noise areas can lead to miscommunication and faulty directions which can, in turn, lead to both fatigue and mishaps.

Repeated exposure to noise can even lead to temporary or permanent hearing loss. You may not even realize the damage until you take your annual hearing test.

Pain may not precede hearing loss. Ringing of the ears, or tinnitus, may occur sporadically, along with a feeling of fullness or fluid in the ears. Indeed, the onset of certain hearing loss is often insidious and slow. Low frequency noise exposure may cause nausea, dizziness, visual problems or intense pain. But you can take preventive measures. Precautions should include routine audiometric monitoring, use of personal ear protection, and avoiding long durations of exposure when possible. Limiting the number of individuals to the minimum necessary for a specific operation, and thoroughly briefing hand signals and other aspects of EROs, for instance, can reduce time and result in safer operations.

Barometric Pressure Stresses

Coming under barometric pressure changes can dramatically reduce crewmember effectiveness during a mission. Such pressure changes occur in the body cavities of the stomach or intestines, the middle ear, the nasal sinuses and the teeth.

Since gases expand when the pressure decreases, the trapped gases inside body and cavities seek escape routes, and not always

through the path of least resistance. Those cavities which are essentially closed obviously represent potential problems. Factors influencing the degree of gas expansion include the altitude of the cabin, the quantity of the gas in the cavity and the number and sizes of escape routes available.

The "GI tract," or stomach and intestines, can produce relief from gas naturally from belching or passing flatus. Still, pain, discomfort, embarrassment or difficulty in breathing may occur. Early symptoms include paleness, coldness or nausea. And while gas expansion may seem to be an amusing or insignificant discomfort, it can lead to nausea, vomiting, extreme pain, compromised circulation, ulcers or ruptured areas.

Again, prevention is the best treatment. Crewmembers can help avoid this discomfort by watching their diet, not eating "on the run," chewing food well, and not swallowing air (or chewing gum which involves swallowing air). Although going against C.R. Terror's regimen, flyers should avoid gas-producing foods such as spicy items, melons, or beans. Tight clothing is also a "no-no." Carbonated beverages and alcohol can also produce gas problems and, in addition, lead to dehydration. With common sense and good judgment, the problems of trapped gas can be greatly reduced.

The middle ear represents another body cavity subject to trapped gas problems. During ascent, air in the middle ear cavity expands, but usually vents into the throat. This process reverses during descent, but must be assisted by yawning, swallowing, chewing, talking or performing a valsalva maneuver. The valsalva maneuver consists of closing the mouth, pinching the nose shut and blowing sharply but *gently*. If the right ear is plugged, for example, tilting the head to the left while performing the maneuver may be helpful. This maneuver may need to be repeated several times upon descent. Should this technique not provide relief, an ear block may occur (a vacuum is established). If the pressure equilibrium is not reestablished, the eardrum could burst.

Although pressure problems with sinuses are rather uncommon, when they do occur, they usually involve intense localized pain at the frontal area. Ordinarily, sinuses should clear automatically, but a crewmember flying with an upper respiratory infection or cold may not be so lucky. Sinus problems occur more often on descent than ascent and may announce their presence with a sudden bloody nose. As with the middle ear block, climbing back to altitude should help the affected person. And like all problems of this sort, give the person immediate medical attention once on the ground.

The dental area also presents relatively infrequent problems due to gas pressure changes. The condition is termed barodontalgia, and normally occurs during ascent, in contrast to other gas problems. It is usually related to unknown or untreated dental problems and is an extremely painful condition which could quickly incapacitate a crewmember. The culprit here might be an abscessed tooth or defective filling. And even though there may be no pain on the ground, once the cabin altitude starts to climb, the pain will start. Routine dental check-ups and good oral hygiene can help prevent this extremely painful surprise.

Hypoxia

The human body demands oxygen. At levels up to 10,000 feet MSL, the body can exist, but beginning at even 5,000 feet MSL, the air is oxygen deficient compared to sea level. Some individuals may be more susceptible to hypoxia than others, but all in all, the seriousness of the threat of hypoxia demands all aircrew members to be aware of its symptoms and treatment.

Basically, when the body does not receive adequate oxygen, critical areas such as the eyes and the brain suffer first. And since hypoxia is normally slow to make its evil presence known, symptoms are often undetected or misdiagnosed. Symptoms also vary from individual to individual, but usually include some kind of vision change. Tunnel vision or loss of peripheral vision and blurring are common. Other symptoms can include headache, discoloration of nails and lips, dizziness, euphoria, hot or cold flashes, judgment errors, personality changes, increased pulse, lack

of concentration, clumsiness, general irritability or fatigue, and even seizures.

Late signs include coma, stupor, and cyanosis. Factors influencing hypoxia include the altitude, rate of decompression, duration of the exposure, individual tolerance level and general physical fitness.

Remember to be aware of your personal signs of hypoxia (through altitude chamber experience) in order to quickly correct any exposure. And if you do recognize your symptoms, administer 100 percent oxygen immediately.

Self-Induced Stresses

While aircrew members can adapt, control or prevent the ordinary stresses of flying to some extent, there is another group of stress factors which can be virtually eliminated. These are the man-made stresses, such as drug (or chemical) ingestion, inadequate nutrition, and rest and general fatigue factors.

Hypoxia symptoms are often undetected or misdiagnosed.

Drugs are counterproductive to efficient human performance and include not only self-medications but alcohol and tobacco. Tobacco smoke contains carbon monoxide which decreases the body's capacity to transport oxygen to the tissues. The tars in tobacco also clog alveoli sacs in the lungs resulting in oxygen deprivation. The carbon monoxide in smoke has a two to three-times greater affinity to body hemoglobin than oxygen, thus greatly reducing the amount of oxygen it can carry to the body's cells, including those in the brain. Smokers may have 10 percent or more of their red blood cells involved with carbon monoxide rather than oxygen transportation. This decreased oxygenation, combined with just one or two other common stress factors such as dehydration or thermal conditions can produce a marginal crewmember in terms of mission effectiveness and personal safety. (For further information on the hazards of smoking, see "Doc Talk" page 14 in the May 1982 issue of *TMF*).

Alcohol metabolizes at the rate of approximately one ounce per hour. Considering crew rest periods, it is not difficult to realize the time involved to digest even a small amount of alcohol safely. In addition, alcohol is a central nervous system depressant, can support hypoxia, and causes general dehydration, a condition not needed in the already arid aircraft environment. Time is the only cure to eliminate alcohol ingestion; there is no morning-after quick fix (see "From Bottle to Throttle" page 8 in the Sep 1981 issue of *TMF*).

Adequate nutrition is also a prime preventative measure. Recently, studies have indicated that inadequate diet may have contributed to some flight accidents (see "Mishap with a Moral" in the June 1982 issue of *TMF* for just one example). Effects such as fatigue, dizziness, hypoglycemia, headache, irritability and lessened ability to concentrate can result from poor eating habits. Dieting should always be monitored by a physician and no one should skip meals on long flights. Skipping breakfast prior to flight may also prove to be a fatal mistake.

The final self-induced stress factor is fatigue. Trying to go the extra mile when you're "running on empty" simply doesn't work, especially when the safety of others hangs in the balance. Fatigue can combine with the effects of several of the previously mentioned stresses or be a factor unto itself. In any event, it's a dangerous, risky state.

Fortunately though, prevention is simple. In the past few years the media has been rampant with "self-help" articles reflecting society's interest in self-improvement. The cure for fatigue and some of the other self-induced stresses lies in caring about yourself. You *can* make the choice to rest and take care of your body. Your responsibilities are indeed significant and you are in a position to make a dynamic contribution to the missions of the Air Force. So as the ad says, "Be all that you can be" and even though it's for an Army recruiting promotion it applies well to what I've been saying. I would add only a final line to the jingle. *Be safe* so you will be able to "be all that you can be."

FATAL DECISIONS

The weather briefing for the West Virginia destination airport wasn't very good, calling for an 800-foot ceiling with light snow and fog, but it appeared acceptable to the pilot of the corporate Cessna Citation. The mission schedule called for an

early morning takeoff from Bush Field, Augusta, Georgia, with three company employees on board. After the leg to Mercer County Airport near Bluefield, West Virginia, and another enroute stop, the mission would terminate back in Augusta. With preflight preparations complete and an IFR flight plan filed with Savannah FSS, the Citation departed Augusta at 0736.

The departure and climb were uneventful for the two highly experienced pilots and their passengers and, after a 45-minute flight, the crew began their descent from FL 290. They contacted Roanoke Approach Control for clearance to Mercer County, were instructed to intercept the 11-DME arc and were cleared for the ILS approach to runway 23.

Roanoke Approach passed the following weather report for Mercer County. "Bluefield weather measured ceiling 700 feet overcast, visibility 1 mile, light snow and fog, temperature 32°, wind 070 at 13, altimeter 29.87. Ceiling is ragged, braking action reported poor by Beech 99. Three-fourths inch snow and ice on runway."

The crew acknowledged the weather and reported the localizer inbound a few minutes later. FSS personnel located on the second floor of the terminal at the airport first sighted the Cessna on what appeared to be a downwind for runway 05. They reported it subsequently entered some clouds. Shortly thereafter, the crew went missed approach and requested and received clearance for another ILS approach to runway 23.

FSS personnel reported the second ILS approach, a straight-in to runway 23, looked normal and that the aircraft appeared to touch down approximately 500 to 2,000 feet down the runway. The landing roll seemed standard until the aircraft passed the taxiway in front of the terminal building, some 1,200 feet from the departure end of the runway. At that point the FSS personnel observed a substantial increase in engine noise from the aircraft. The aircraft rotated for takeoff, but did not become airborne and overran the end of the runway. It struck three localizer antennas and a 10-foot embankment before plunging down a steep, densely-wooded hillside. All five occupants were killed and the aircraft was completely destroyed by impact forces and post-crash fire.

The aircraft rotated for takeoff . . . but did not become airborne.

ANALYSIS:

The National Transportation Safety Board (NTSB) investigation of this fatal accident centered around the weather at Mercer County, the condition of the runway surface, and the aircraft's landing and go-around performance capabilities.

The NTSB determined the weather forecast for arrival and the weather observation passed to the crew by Roanoke Approach Control were both essentially accurate. They also felt the pilots of the aircraft were fully aware of the existing weather conditions prior to commencing the approach. The investigators noted, however, that the crew elected to land on runway 23 following the second approach even thought it meant landing with a 10-knot tailwind.

The investigators were also able to establish the approximate condition of the runway surface at the time of the accident. An airport employee began plowing the runway at 0630, finishing at approximately 0830. He reported to the airport manager that braking action was poor after the first plowing. The runway was plowed again, starting at 0930, nearly an hour after the accident occurred.

At 0700, a local Cessna Citation copilot drove his vehicle onto the runway to inspect the runway condition. He stated that after the initial plowing there was slush on the runway, the runway grooves were not noticeable and the braking action was nil. A commercial air carrier Beech 99 pilot reported the runway was plowed before he took off at 0809 but that the runway grooves *were* visible. He was unable to run his aircraft's engines up to full power during a static check on the snow-covered runway, however, because he was unable to prevent his aircraft from sliding. The Beech 99 pilot's report of poor braking action resulted in the issuance of notam 1006 warning of poor braking action.

Another locally based Citation pilot inspected the runway at 0915, about 30 minutes after the accident. He, too, testified the braking action was nil, the runway had been plowed, the runway grooves were full of slush and about one-fourth inch of snow and slush remained on the runway.

An analysis of the Citation aircraft flight manual (AFM) revealed all takeoff and landing data in the AFM was based on a dry paved runway. The manual, however, did not contain

correction factors to use when operating on wet or icy runways. Based on the AFM, the dry landing roll for the accident aircraft was 2,625 feet when operating with a 10-knot tailwind. Yet, according to the aircraft operating manual, a pilot could expect the landing field length requirements to increase over flight manual values by 50 percent when operating on a wet runway and 100 percent when operating on an icy runway. Therefore, the landing field length required to stop the Citation on the icy runway at Bluefield would have been 5,250 feet, exceeding the total runway length by 508 feet. Since witnesses placed the aircraft's touchdown area between 500 and 2,000 feet past the threshold, the NTSB determined the aircraft could not have been stopped on the runway. The question of the attempted go-around was also investigated.

Based on data supplied by the aircraft's manufacturer and on reports from eyewitnesses, the NTSB determined the pilot did not recognize the insufficient braking action of the runway and, because of this, failed to initiate a timely go-around. All of the witnesses were consistent in their testimony that engine thrust was increased when the aircraft was approximately 1,000 feet from the departure end of the runway. They all stated the aircraft rotated to a takeoff attitude but never became airborne.

According to the manufacturer, the minimum speed for nosewheel liftoff is approximately 81 knots, and the minimum takeoff speed is approximately 91 knots. Based on that information and the reports of the eyewitnesses, the NTSB determined the aircraft was probably traveling between 81 and 91 knots when it departed the end of the runway. Since the aircraft never lifted off, the investigators felt it was evident the aircraft had not reached the minimum takeoff speed of 91 knots.

Further computations by the board revealed the aircraft might have achieved minimum liftoff speed if full power had been applied between 1,400 and 1,800 feet from the departure end of the runway. But this would have allowed the pilot only 9 to 15 seconds after touchdown to make the go-around decision.

. . . the landing field length . . . exceeded actual runway length by 508 feet.

The board also evaluated landing distances had the pilot attempted to land on runway 05. Even though a 10-knot headwind would have reduced the landing distance, the NTSB report stated a safe landing probably could not have been made on that runway either.

FINDINGS:

Several of the NTSB findings are significant to MAC aircrew members:

1. There were no indications of mechanical failure or malfunction of the aircraft which would have caused or contributed to the accident.
2. The crew was aware of the weather and the condition of the runway surface prior to the landing approach.
3. The aircraft operating manual contained information which showed the aircraft could not be stopped on the runway under the existing conditions.
4. The pilot failed to immediately recognize the insufficient braking action and delayed the decision to go-around until there was insufficient runway remaining to accelerate to flying airspeed.
5. The unsuccessful go-around attempt increased the severity of impact forces, and probably increased the possibility of a post-crash fire and fatal injuries.
6. The pilots used poor judgement in attempting the landing under the conditions that existed.

PROBABLE CAUSE:

The NTSB determined the probable cause of this accident was the pilots' decision to attempt a landing on a snow and slush-covered runway with insufficient stopping distance available. This delayed decision to initiate a go-around resulted in an insufficient amount of runway available to complete the maneuver successfully. A contributing cause was a lack of emphasis in the manufacturer's AFM concerning the field length required to stop with a wet or icy runway.

This crew was experienced, current and had flown into this airport many times before. The short runway and the difficulty stopping the Citation on it were well-known facts to the pilots flying for the corporation. In all, it wasn't the winter weather that killed these two pilots and their three passengers. This accident was caused by a combination of ignorance, complacency and what turned out to be the aircrew's fatal decisions.

—Adapted from *NTSB-AAR-81-9*

MAC INDIVIDUAL FLYING-HOUR MILESTONE AWARDS

10,000

Lt Col William A. Brown, Jr., 20 MAS
Lt Col David D. Wilson, 9 MAS
Maj Michael C. Friel, Jr., 8 MAS
Maj Stanley L. Penkova, 8 MAS
CMSgt Gary W. Sloan, 8 MAS
SMSgt Charles E. Aylward, 9 MAS
SMSgt Billy J. Carter, 907 TAG

5,000

Col Grant S. Pyle, 129 ARRS
Col Charles E. Wicker, 67 ARRS
Lt Col William F. Austin, III., 40 ARRS
Lt Col Allen W. Boone, 129 ARRS
Lt Col Charles K. Cross, Jr., 129 ARRS
Lt Col William P. Hagopian, 129 ARRS
Lt Col Gene W. Hall, 129 ARRS
Lt Col James R. Hemphill, 139 TAG
Lt Col John R. Howard, 67 ARRS
Lt Col Edwin W. Lewis, Jr., 129 ARRS
Lt Col Paul R. Marlin, 8 MAS
Lt Col Terrence M. McLean, 8 MAS
Maj Charles E. Baerte, 67 ARRS
Maj Charles S. Baker, 129 ARRS
Maj Russel Padula, 129 ARRS
Maj Theodore R. Schindler, II., 129 ARRS
Maj Jerry W. Wolf, 7 MAS
2Lt James P. Osborn, 67 ARRS
SMSgt James F. Badgrow, 129 ARRS
MSgt Gus J. Pappas, 129 ARRS
MSgt James W. Swanson, 76 MAS
MSgt Robert Tanguay, 67 ARRS
MSgt Curtis A. Weil, 129 ARRS
TSgt Richard W. Collins, 67 ARRS
TSgt Johnny B. Harp, 67 ARRS
SSgt John R. Brown, 375 CAMS

2,500

Lt Col Carl E. Anderson, 40 ARRS
Lt Col Richard R. Mulder, 40 ARRS
Maj James E. Ackert, Det 24, 40 ARRS
Maj John S. Burks, 129 ARRS
Maj Billy F. Freeman, 129 ARRS
Maj John N. Komich, 129 ARRS
Maj Kenneth Schroeder, 67 ARRS
Maj Joseph L. J. Viviano, 67 ARRS
Capt Brian E. Fess, 129 ARRS
Capt Frank A. Gray, 67 ARRS

(Ranks and units are those at time of award. See MACR 900-3 for details on how to apply for your own milestone award.)

C.R. TERROR

The Maladroit Major maroons some Marines in the Mojave.

From the halls of Montezuma, to the shores of Triple A. . ." The lilting tune of the famous hymn lost some of its deeper meaning as it was sung sweetly by MAC's most senior major.

"Uh, pardon me, Boss. Isn't that supposed to be the shores of 'Tripoli?'" asked C.R.'s competent copilot.

"Triple A or Tripoli, what's the difference?" asked the Ace of Aerospace. "A Marine's a Marine, and we're in MAC and never the twain shall meet. By the way, Sammy, how's our ETA for 29 Coconuts?" C.R. was beginning to feel the hunger "fangs" of the ever present growlings coming from deep down in his innards. The Flatulent Flyboy yearned for some hearty Southern California-style Mexican food.

"My guess is we should be down and have this platoon of Marines offloaded in about an hour," replied Sammy to his Boss' inquiry. "Given the flying time to Morton, you should be at Cha-Cha's Chili Haven by 1930 local."

"Sammy, you are truly one in a million! But how did you know about the locale of one of the truly great restaurants of this era?" asked the Pudgy Pilot with thoughts of Cha-Cha's chili special with frijoles simmering on his mind.

"Boss," replied the staunch second-seater, "we must have RON'd a thousand times at Morton, and every time we depart for home, you remind us

all the way about the food at Cha-Cha's—in more ways than one, if you catch my meaning."

Surprisingly, the good-natured banter of the crew continued all the way down final, yet had no effect on C.R.'s landing. Or maybe it did, for the approach and landing to the expeditionary airfield was surprisingly smooth. In fact, the whole flight had gone smoothly right from the beginning. By the time the Field-grade Fumbler and his crew had offloaded the Marines at 29 Coconuts and landed at Morton, C.R. had completed a nearly flawless flight. Needless to say, his crew was certainly surprised. Acknowledging their Semi-able AC's exceptional performance to one another, the crew adjourned for a well-deserved RON. Probably even more amazing to the Capable Quartet was C.R.'s behavior at Morton the next morning.

"Has anybody seen the Boss this morning?" asked Max.

"Guys, you're never going to believe this. He's already filed us to 29 Coconuts, Harry Point, and then home. But the most amazing part is yet to come," intoned Blinky. "He's now at the

plane going over the forms."

"You're right, sir," replied Sergeant Downs. "That just couldn't be Major Terror."

"Maybe not, Ty," replied Max, "but I still suggest we wait till we arrive safely back home—without our usual load of violations—before passing judgment on the Boss."

"Good point, Max. Let's be especially on our toes today. After all," emphasized Sam, "the Boss has never gone more than 24 hours without a mishap—large or small." But before Sam could finish his sentence and step off the crew bus, the crew was in store for yet another surprise.

"Well boys, looks like we'll be home in time for supper," the Ace of Airlift greeted his crew. "Mother MAC has approved an ASAP departure for 29 Coconuts. As soon as Max makes his usual thorough walk-around, we're off for the desert to pick up our load of troops, take them home and then head for the barn."

The short hop from Morton to 29 Coconuts was completed without a hitch. But after landing at the Marine Corps expeditionary airfield, though, things began to go a bit awry.

"Major, are you the aircraft commander of this machine?" C.R. turned around to find one of the biggest, toughest-looking lieutenant colonels he had ever seen towering over his practically dwarfed frame.

"Er, uh, yes sir, colonel. Major Terror, at your service." Somehow, the Rotund One managed to stammer out a salutation and the towering Marine officer literally roared back.

"Please to meet you, Major Terror," he growled, grasping the Portly Pilot's pudgy palm, squeezing heartily and shaking C.R.'s hand until his arm very nearly came out of its socket. "My men and I are ready to hit the road when you are. Glad you could get here so early. Tonight's a big night for the ol' USMC. We're having our annual Marine Corps anniversary party back at Harry Point and I promised our commander we'd be back home in time for the festivities. Dress fatigues, you know." Lieutenant Colonel W.E.R. Tuff boomed out his

wishes to C.R. "With you guys getting here so early, we'll be able to make it back in plenty of time to change on the ground instead of having to change on the plane."

"But sir," C.R. replied with an obviously consternated look on his amply-furrowed brow, "I'm afraid I'll have to okay the early departure with MAC. You see . . ."

"I don't care who you have to call, Major. You just get me out of here as fast as you possibly can. In other words, *A-S-A-P*." Colonel Tuff huffed and fumed at the Befuddled Field-grader.

"But sir," C.R. mumbled up from his cowering cringe," what about your inflight lunches? After all, it is a long flight back to Harry Point, and . . ."

"Major Terror, those are United States Marines. They will do what I tell them, when I tell them. And if I tell them not to eat, they won't eat. Now get me out of here—lunches or no lunches."

Quick as a flash, or at least as fast as his stubby little legs would carry him, C.R. dashed for the ALCE to make some hurried contacts with Mother MAC. As he entered the tent, he saw reposed by the HF radio, the ALCE's only contact with the outside world, another major who, from the blank expression on his face, had already had some "personal" contact with Colonel Tuff.

"Good morning, Major Terror. Looks like you could use this cup of coffee more than me," he said as he half-heartedly handed the cup of infamous ALCE-strength java to C.R.

"Coffee? Crimenently, son! That 'Girene' out there is about ready to skin me alive and you offer me coffee? I need to get out of here ASAP. Who do I call?" queried the Worried Warrior.

"Sorry, sir. I can only approve a 30-minute early go. I *can* ask 22d Air Force for more, but that could take me another hour or so. Sunspots, you know. Of course," continued the fatigue-suited officer, "if you want to take personal responsibility for an unauthorized early departure, you just go ahead and be my guest." As the final words fell from the ALCE Major's lips, C.R. fired out of the tent like a shot from the proverbial cannon—a cannon, that is, with only a half load of powder.

"Head 'em up and move 'em out!" C.R. shouted at the top of his over-taxed lungs. "We're off for Harry Point." Colonel Tuff looked over his shoulder about that time to see the Worried Warrior running with all his might toward the camouflaged Hercules, still giving orders at the top of his tobacco-stained lungs. "Kick the tires, light the fires, full speed ahead! Harry Point, here we come!" C.R. directed as he literally leaped aboard the Lockheed legend. Witnessing these events at some distance from the Field-grade Flyboy, Max turned to Sam and sighed in deep resignation.

"Well, sir," he breathed out deeply, "looks like our perfect trip with Major Terror has come to a suddenly abrupt halt."

As soon as all the troops were aboard the C-130, C.R. "coasted out" under nearly maximum power."

"Slow down, Boss," cautioned Sammy. "All we have to do is run off into the sand and we'll be stuck here for days."

"Sammy, m'lad. If we don't make like a flash and strike out of here, there's no reason why we all shouldn't just stay here and die a slow, painful death under the burning Southern California sun," C.R. replied as he marginally managed the Herk. "That Marine LC is about ready to kill me, anyway."

"Pilot, loadmaster. Sir, it looks like we're getting awfully close to the edge of the taxiway on the right side." But no sooner had Ty issued the fateful warning than the lumbering Lockheed lunged off the desert taxiway and into the soft, Southern California sand. C.R., though, could not remember the commands to stop the Hercules' trip through the sandy soil.

"Shut down the engines! Throw out the anchor! All engines, stop!" he yelled on hot mike, deafening all on headset. Sammy, though, saved the day by unobtrusively taking control of the Herk and T-handling the numbers 3 and 4 engines. Before the dust-gulping engines could wind down, Colonel Tuff was up on the flight deck like a shot out of a 105-recoiless rifle.

"What's the meaning of this unscheduled excursion through the desert, Major Terror? Why aren't we

listing to starboard?" Colonel Tuff was firing questions at the Marginal Major faster than C.R.'s subsonic brain could handle the queries.

"Sir," replied the staunch second-in-command, "I'm afraid we're stuck in the sand. And judging from our angle, it may take several bulldozers to get us out of here."

"Nonsense, lieutenant," roared back the Marine officer, sensing who had just saved the day. "Why, you've got 92 Marines in the back there complete with entrenching tools. We'll have you dug out of here in no time at all." Turning away to climb down from the flight deck, Tuff looked back to see C.R. still slumped forward in his seat, not fully conscious of the last few minutes' events. "Come on, Major. You got us into this mess, and you're going to help get us out!" With that, the Marine LC literally jerked C.R. from his seat and personally escorted him to the front of the listing Lockheed. There, along with the 92 other Marines, C.R. took up Colonel Tuff's shovel and began to dig the Herk out of the sand.

An hour later, the Herk had been literally and figuratively pulled from the sand by C.R. and the Marines—mostly the latter. But the Exhausted Airlifter was still collapsed in his seat 45 minutes after takeoff from 29 Coconuts.

"You know, Sam, I never knew those Marines could work so hard and so fast. And we even made it out only 40 minutes late."

"Yeah, Boss," replied Sam, "they do work pretty hard. You wielded Colonel Tuff's shovel pretty well yourself."

"Maybe so, Sam," intoned the Master Manipulator, "but I may never play the piano again. Just look at those hands. Why, even my blisters have blisters on them. I think you'd better take us to Harry Point. After all, you do have better hands than I do."

Sam, Max, Ty and Blinky looked at each other and smiled knowingly.

"Right you are, Boss." Sam acknowledged. "Right you are."

QUICK STOPPERS

What a Difference An "A" Makes

Engine change completed, the Super Jolly sported a T-64-GE-7 engine mounted in the number 2 position. For the functional check flight the quality control inspector briefed the HH-53 crew that the number-2 engine was a T-64-GE-*7A* model. Unfortunately, the engine shop hadn't told quality control of the change from a -7A engine to the -7 engine.

Well, the -7A engine isn't that much different, right? Wrong! The FCF crew topped the -7 engine to -7A limits which are more liberal. Result: an overtemp and damage to the combustion section of the engine. Cost of this Super Jolly miscommunication: $29,000.

Over and Out

Cruising along at 220 knots at FL 410, this particular CT-39 crew was attempting to avoid several thunderstorms of the *cumulo bumpus* variety. The smooth flight was abruptly interrupted by an encounter with moderate clear air turbulence, resulting in a flameout of the Sabreliner's number 2 jet. Reacting properly, the crew began an immediate descent in VMC and accomplished the inflight engine shutdown checklist. Following a leveloff at FL 190, the crew managed a successful airstart and continued to an uneventful landing. Postflight inspection of the balky engine showed no mechanical reason for the flameout. The most probable cause for the flameout, reasoned the safety-types, appears to be that old combination of high altitude and turbulent air. It all goes to prove, it's still a risky business to attempt to overfly a thunderstorm—*whatever* the altitude.

—From 375 AAW *SabreLines*

Smokin' Scope

Early in the flight, smoke began coming out around the DC-8 radar scope. After the crew accomplished a portion of the electrical fire checklist, the smoke stopped. About 30 minutes later, the smoke reappeared and the electrical fire checklist was accomplished once more. Again, true to form, the smoke ceased. About half an hour later, the smoke appeared yet a *third* time. This time, however, an explosion occurred near the source of the smoke. The crew dumped fuel and immediately diverted to a nearby airport where an inspection found an improperly wired autospoiler motor that had overheated and exploded.

—Delta Airlines *Up Front*

Ice Capades

While climbing at 750 feet per minute and passing through 13,000 feet for FL 200, the Herk crew encountered heavy rain. Clear ice began to build up on the windshield wipers and the leading edges of the wings. Engine anti-ice systems were in auto and the crew immediately turned on the wing anti-ice. At 13,500 feet, the crew noticed a slowing in the climb rate as the torque began to decrease. As throttles were increased to full power, number-1 and -2 engines overtemped. Power was then reduced and the temperature datum system was switched to manual. The crew was unable to maintain 13,000 feet with engine torques continuing to drop. At this point the crew decided a descent to a lower altitude might be a prudent precaution, especially since they were descending anyway. After stopping their descent at 6,000 feet, full normal engine response was regained—approximately 10 minutes after the initial problems.

The source of this Herk's predicament was ice accumulation on the upper inside of the engine inlet air ducts with a corresponding reduction of air flow and a resultant power loss. Consider this warning in the Dash One. "If possible, avoid flight in freezing rain, particularly at low airspeeds with corresponding higher angles of attack. There is possibility of ice accretion on the upper inside of the engine inlet air ducts. This condition may result in a multi-engine power loss or flame out."

Tactical Tire Drop

The Starlifter crew was performing a routine touch-and-go landing at a West Coast base. Their plane's number 7 wheel, imagining a green light, decided to enter the airdrop mode and promptly exited the plane. Following a successful low altitude drop, the wheel came to rest on the side of the runway. Tower, meanwhile, contacted center who notified the unsuspecting crew of the unplanned drop. After entering a holding pattern, the crew visually inspected and pinned the gear, then made an uneventful landing.

Looking back, it seems that the aircraft had flown 23 touch-and-go and 2 full-stop landings since the wheel was changed. Yes, the wheel was improperly installed and inadequately inspected. The maintenance folks in this incident have been decertified and retrained.

Notable Quote

As a postage stamp which lacketh glue, so are the words of caution to a fool; they stick not, going in one ear and out the other, for there is nothing between to stop them.

—Flight Safety Bulletin

Two-Engine Starlifter

On climbout from a foreign base, the Starlifter's number-1 low-oil-quantity light illuminated with the temperature and pressure normal. Soon thereafter, at about 27,000 feet, the oil pressure fluctuated out of limits. The crew shutdown the errant engine, declared an emergency and began a descent for return to a nearby base. In the descent the AC retarded the throttles to flight idle, and guess what happened next? The number-4 engine-oil temperature reached 115° with oil pressure fluctuations out of limits on that engine, too. Additionally, the number-4 low-oil-pressure light came on steady. Time to shutdown number 4, right? Well, that's what this crew did, and fortunately they made an uneventful two-engine landing.

More surprises were in store for the crew, however. After the landing roll, the number 2-engine oil pressure dropped to 30 PSI and the number-3 engine oil pressure decreased to 34 PSI. Both numbers 2 and 3 oil temperatures were approximately 85°. The crew taxied the aircraft clear of the runway and shutdown the remaining two engines as a precautionary measure, silently grateful they had not become a "Starglider."

Oil servicing and quantities were checked on all engines. No servicing was required on numbers 1 and 4. However, the number 3 engine required five quarts of oil and number 2 engine needed four quarts. After extensive troubleshooting and an FCF could not turn up any other discrepancies, the aircraft was released for flight.

AFTER DEADLINES

CONGRATULATIONS TO MAC PRIMARY DUTY SAFETY OFFICERS selected to pin on Lieutenant Colonel and Major. Selected for Lieutenant Colonel were Majors Doug Brazil, 463 TAW; Jerry Clearman, 63 MAW; Richard Lettan, 60 MAW; Eugene Selby, 443 MAW; and Patrick Stajdel, 438 MAW. Picked up for Major on the last board were Captains Ron Barber, 76 ALD; Samuel Beyers, 435 TAW; Robert Bruce, 437 MAW; Alan Hider, 89 MAW; Willis Rice, 22 AF Safety; and John Curry, Stan Danielsen, John O'Reilly and Jim White from HQ MAC Safety. TMF wishes each of these officers continued success in their careers.

ONE OF THE SHORTEST ACCEPTANCE FLIGHTS ON RECORD was completed on 2 October 1982 at Dobbins AFB, Georgia. On that day, the 700 TAS took delivery of its first C-130H from Lockheed-Georgia Company, located just across the field. After taxiing out from the Lockheed plant, the "City of Marietta," named for the city in which both the AFRES unit and Lockheed are located, pulled up into the closed pattern at Dobbins, landed, then taxied to the Air Force side of the field. On hand to accept the first plane in the Air Force Reserve's program to modernize its airlift force was Major General James McAdoo, 14th Air Force Commander. The 700 TAS is slated to receive five more Herks from Lockheed's assembly line before the end of this year.

437 MAW HONORS LOADMASTER--On 13 September, 1982, a 437 MAW 20-ship C-141 Reforger exercise formation winged its way across the Atlantic heading for a drop zone in Germany. On the first load of the 41st MAS lead ship was this placard made by Staff Sergeant Mark A. Smith, 41 MAS. It honors the late Chief Master Sergeant Monty G. W. Nicholson, who had accomplished the wing load planning for the airdrop. Chief Nicholson perished on 31 August 1982 in a Starlifter mishap south of Knoxville, Tennessee. Information courtesy of 41 MAS. USAF photo by Captain Gene Clouse.

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Touch 'n Go